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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,577	02/23/2004	Donald Thomas McGrath	RD-27645-2	9571

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EXAMINER

SHINGLETON, MICHAEL B

ART UNIT PAPER NUMBER

2817

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/784,577

Applicant(s)

MCGRATH

Examiner

Michael B. Shingleton

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/24/2006
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-29 is/are pending in the application.
- 4a) Of the above claim(s) 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26, 28 and 29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Claim 27 has been withdrawn from consideration because it is directed toward the combination of a BFL and a chopping circuit that was the subject of the previous parent application serial number 09/682,863. Note the restriction requirement in 09/682,863. The search for the combination of the BFL and the chopping circuit now present was not required for the BFL circuit. This places an additional burden on the examiner. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 27 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP 821.03.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Biard 4,661,726 (Biard).

Figure 4 and the relevant text of Biard discloses a buffered field effect transistor (BFL) level-shifting/inverter circuit having an "inverter stage" input "IN", a first depletion mode inverter that receives i.e. is responsive to the "inverter stage" input IN signal at a depletion mode MOSFET 30, and a buffered field effect transistor logic stage. The buffered field effect transistor logic stage has a first depletion mode MOSFET 32 and a second depletion mode MOSFET 37. A voltage drop or what is commonly called a level shifter is connected between the first and second transistors and is composed of elements like 33, 34. The node between element 32 and 33 forms a first output and the node between element 37 and 36 forms a second output. It is important to note that column 1, around line 50 of Biard recites that the logic gates of the invention "will therefore be described in terms of such logic gates" i.e. MESFETs, but Biard is also very specific that "[t]hose skilled in the art will readily perceive that the invention (which includes the BFL of Figure 4) may be used with any logic gate utilizing depletion mode FET's. Such FET's may be metal oxide semiconductor field effect transistors (MOSFET's)...(emphasis added)." Thus the Figure 4 embodiment is clearly applicable to MOSFETs and includes depletion mode MOSFETs. Biard is silent

on the type of depletion mode MOSFET, i.e. NMOS or PMOS. NMOS and PMOS depletion mode MOSFETs are conventional forms of depletion mode MOSFETs.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used depletion mode NMOS transistors for the transistors of Biard because, as the Biard reference is silent on the exact depletion mode FET used one of ordinary skill in the art would have been motivated to use any art-recognized equivalent depletion mode FET such as the conventional depletion mode MOSFET.

As to the newly added claim language, the device of Biard is capable of performing the newly recited function and as such Biard meets these newly added limitations (See *In re Schreiber*, 128 F. 3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biard 4,661,726 (Biard) in further in view of Tohyama 4,810,907 (Tohyama) and Alok et al. 6,559,068 (Alok).

Figure 4 and the relevant text of Biard discloses a buffered field effect transistor (BFL) level-shifting/inverter circuit having an input "IN", a first depletion mode inverter that receives the IN signal at a depletion mode MOSFET 30, and a buffered field effect transistor logic stage. The buffered field effect transistor logic stage has a first depletion mode MOSFET 32 and a second depletion mode MOSFET 37. A voltage drop or what is commonly called a level shifter is connected between the first and second transistors and is composed of elements like 33, 34. The node between element 32 and 33 forms a first output and the node between element 37 and 36 forms a second output. It is important to note that column 1, around line 50 of Biard recites that the logic gates of the invention "will therefore be described in terms of such logic gates" i.e. MESFETs, but Biard is also very specific that "[t]hose skilled in the art will readily perceive that the invention (which includes the BFL of Figure 4) may be used with any logic gate utilizing depletion mode FET's. Such FET's may be metal oxide semiconductor field effect transistors (MOSFET's)...(emphasis added)." Thus the Figure 4 embodiment is clearly applicable to MOSFETs and includes depletion mode MOSFETs. Biard is silent on the type of depletion mode MOSFET, i.e. NMOS or PMOS. Alok discloses that silicon carbide NMOS and PMOS depletion mode MOSFETs formed on a silicon carbide substrate are conventional forms of depletion mode MOSFETs (See entire reference.). Alok also teaches the motivation for use of Silicon Carbide transistors that includes that they are ideal for "high voltage, high frequency and high temperature" (See column 1, around line 33).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used silicon carbide depletion mode NMOS transistors formed on a silicon carbide substrate for the transistors of Biard because, as the Biard reference is silent on the exact depletion mode FET used one of ordinary skill in the art would have been motivated to use any art-recognized equivalent depletion mode FET such as the conventional silicon carbide depletion mode NMOS MOSFET formed on a silicon carbide substrate. Additionally one of ordinary skill would have been motivated to make the combination because of the higher voltage handling, the higher frequency capabilities and the higher temperature handling capabilities as compared to conventional Si based MOS devices as taught by Alok. Silicon carbide MOSFETs are better FETs.

Biard is silent on the use of resistor(s) for the voltage drop circuit.

Tohyama shows that the resistor, the diode and the "diode connected" FET like that of Biard are all art-recognized equivalent voltage drop circuits for use in BFT's.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the voltage drop circuit of Biard with a resistor because two voltage drop circuits are well known to be equivalent in the art as taught by Tohyama.

Because the combination made obvious above includes depletion mode NMOS transistors, this circuit being the same as that claimed is configured to operate with a negative direct current bias on each of the gates with respect to the associated channel.

#### *Response to Arguments*

Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306 and after July 15, 2005 the fax number will be 571-273-8300. Note that old fax number (703-872-9306) will be service until September 15, 2005.

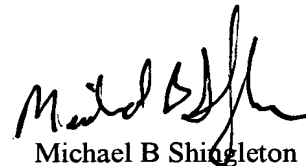
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS

January 20, 2006

July 4, 2006

A handwritten signature in black ink, appearing to read "Michael B Shingleton", written in a cursive style.

Michael B Shingleton  
Primary Examiner  
Group Art Unit 2817